

CLAIMS:

1. A chimeric polypeptide comprising:
 - (a) a vacuole targeting sequence encoding a polypeptide; and
 - (b) a sequence encoding a plant-noxious pest control protein linked in operable combination to said targeting polypeptide.
2. A polypeptide as claimed in claim 1 wherein the vacuole targeting polypeptide is a signal sequence polypeptide.
3. A polypeptide as claimed in claim 2 wherein the signal sequence polypeptide is selected from proteinase inhibitor signal sequence I or II.
4. A polypeptide as claimed in any one of claims 1 to 3 wherein the pest control protein is selected from binding proteins, proteinase inhibitors and degradative enzymes.
5. A polypeptide as claimed in claim 4 wherein the proteinase inhibitor is selected from aprotinin kunitz-type inhibitors, soybean, arrowroot, taro, proteinase inhibitors 1, proteinase inhibitor 2, alpha-1 antitrypsin, Bowman-Birk inhibitors from soybean and cowpea, and oryzacystatin.
6. A polypeptide as claimed in claim 4 wherein the binding protein is selected from riboflavin, carotenoid, fatty-acid, retinol, alpha-tocopherol, folate, thiamin, pantothenate and biotin binding proteins.
7. A polypeptide as claimed in claim 6 wherein the biotin-binding protein is selected from avidin, streptavidin, biotin-binding antibodies and fragments thereof, biotin halocarboxylase synthetase, biotinidase and bacterial proteins.
8. A polypeptide as claimed in claim 7 wherein the biotin-binding protein is avidin, streptavidin or a functionally equivalent variant thereof.
9. A polypeptide as claimed in any one of claims 1 to 8 further comprising at least one additional sequence encoding a protein or peptide.
10. A polypeptide as claimed in claim 9 wherein the additional sequence encodes a further plant-noxious protein, pest control protein, or an antimicrobial, antifungal, or antiviral protein.
11. A polypeptide as claimed in claim 10 wherein the additional sequence encodes a pest control protein.

12. A polypeptide as claimed in claim 11 wherein the pest control protein is a *Bacillus thuringiensis* (Bt) insecticidal protein.

13. A polypeptide as claimed in claim 12 wherein the Bt protein is a Cry protein.

14. A polypeptide as claimed in claim 13 wherein the pest control protein is a proteinase inhibitor.

15. A polypeptide as claimed in claim 14 wherein the proteinase inhibitor is an aprotinin.

16. An isolated nucleic acid molecule encoding a polypeptide as claimed in any one of claims 1 to 15.

17. A nucleic acid molecule as claimed in claim 16 which is a DNA molecule.

18. A vector comprising a DNA molecule as claimed in claim 17.

19. A host cell transformed with a vector as claimed in claim 18.

20. A host cell as claimed in claim 19 which is a plant cell.

21. A method for producing a polypeptide as claimed in any one of claims 1 to 15 comprising the steps of:

- (a) culturing a host cell which has been transformed or transfected with a vector as claimed in claim 18 to express the encoded polypeptide; and optionally
- (b) recovering the expressed polypeptide.

22. A method for producing a pest resistant plant, comprising transforming the plant genome to include at least one DNA molecule as claimed in claim 17.

23. A transgenic plant that contains a DNA molecule as claimed in claims 17.

24. A transgenic plant as claimed in claim 23 further comprising at least one additional DNA molecule encoding a protein or peptide.

25. A transgenic plant as claimed in claim 24 wherein the additional DNA molecule encodes a further plant-noxious protein, pest control protein or an antimicrobial, antifungal or antiviral protein.

26. A transgenic plant as claimed in claim 25 wherein the additional DNA molecule encodes a pest control protein.

27. A transgenic plant as claimed in claim 26 wherein the pest control protein is a *Bacillus thuringiensis* (Bt) insecticidal protein.
28. A transgenic plant as claimed in claim 27 wherein the Bt protein is a Cry protein.
29. A transgenic plant as claimed in claim 28 wherein the pest control protein is a proteinase inhibitor.
30. A transgenic plant as claimed in claim 29 wherein the proteinase inhibitor is an aprotinin.
31. A transgenic plant expressing pesticidally effective concentrations of a chimeric polypeptide as claimed in any one of claims 1 to 15.
32. A method for controlling or killing pests comprising administering to said pest an amount of a chimeric polypeptide as claimed in any one of claims 1 to 15, which is effective to control or kill said pest.
33. A method as claimed in claim 32 wherein the chimeric polypeptide is expressed in a plant.
34. A method as claimed in claim 32 or claim 33 further comprising administering to said pest a pest control protein.
35. A method as claimed in claim 34 wherein the pest control protein is a Bt protein.
36. A method as claimed in claim 35 wherein the Bt protein is a Cry protein.
37. A method of controlling or killing pests comprising administering a chimeric polypeptide as claimed in any one of claims 1 to 8 which includes a sequence encoding a pest control protein and a second pest control protein, where the combination provides more effective control than administration of the second pest control protein alone.
38. A method of preventing attack, or controlling or killing pests, on a transgenic plant as claimed in any one of claims 23 to 31 comprising treating the plant with a composition comprising a pest control protein.
39. A method as claimed in claim 38 wherein the pest control protein is Bt.
40. A method as claimed in claim 39 wherein the Bt protein is a Cry protein.
41. A method as claimed in any one of claims 38 to 40 wherein the composition is a spray.

42. A method as claimed in any one of claims 38 to 40 wherein the composition is a dust.

43. A method as claimed in any one of claims 32 to 42 wherein the pest is selected from:

cotton bollworm (*Helicoverpa armigera*);
tropical army-worm (*Spodoptera litura*), also *S. littoralis*, *S. exigua*;
European corn-borer (*Ostrinia nubilalis*);
tobacco horn worm (*Manduca sexta*);
loopers (*Chrysodiexis* spp.);
rice stem borer (*Chilo suppressalis*);
porina (*Wiseana* spp.);
cutworms (*Agrotis* spp.);
diamondback moth (*Plutella xylostella*);
potato tuber moth (*Phthorimaea operculella*);
codling moth (*Cydia pomonella*);
Indian meal moth (*Plodia interpunctella*);
gypsy moth (*Lymantria dispar*);
argentine stem weevil (*Listronotus bonariensis*);
clover root weevil (*Sitona lepidus*);
grass-grubs (*Costelytra zelandica*, *Odontia* spp.);
corn rootworm (*Diabrotica virgifera*);
rice and wheat weevils (*Sitophilus* spp.);
mealworms (*Tenebrio molitor*);
flour beetles (*Tribolium confusum*);
black field cricket (*Teleogryllus commodus*);
locusts (*Locusta migratoria*);
Sawflies (*Sirex* spp., *Nematus olgospilus*);
Western Flower thrips (*Frankliniella occidentalis*);
Hessian flies (*Mayetiola destructor*);
two-spotted mite (*Tetranychus urticae*); and
European red mite (*Panonychus ulmi*).

44. A composition comprising a polypeptide as claimed in any one of claims 1 to 15 and a carrier, diluent, excipient or adjuvant.

45. A composition comprising material derived from a plant as claimed in any one of claims 23 to 31 and a carrier, diluent, excipient or adjuvant.

46. A composition as claimed in claim 45 wherein the carrier is an agriculturally acceptable carrier.

47. A composition as claimed in any one of claims 44 to 46 which is a pesticidal composition.

48. A composition as claimed in any one of claims 48 to 47 which further comprises one or more antifungal, antiviral, antimicrobial or pest control proteins.

49. A composition as claimed in claim 48 wherein the pest control protein is a *Bacillus thuringiensis* (Bt) insecticidal protein.

50. A composition as claimed in claim 49 wherein the Bt protein is a Cry protein.

51. A composition as claimed in claim 50 wherein the pest control protein is a proteinase inhibitor.

52. A composition as claimed in claim 51 wherein the proteinase inhibitor is an aprotinin.

53. A method for producing a plant-noxious protein, the method comprising extracting the protein from a plant incorporating in its genome a DNA molecule as claimed in claim 17.

54. Seed that is the product of a plant as claimed in any one of claims 23 to 31.